

## SANITARY EXPERT LAYS STRESS ON NECESSITY FOR MOSQUITO WAR

[A paper read before the Chamber of Commerce on February 17 by Dr. E. R. Marshall of the U. S. Public Health and Marine Hospital Service.]

Mr. President and Gentlemen:

In the few minutes at my disposal I wish to present to you a few facts relative to the mosquito eradication campaign, which was instituted in Honolulu in November, 1911, and which is being continued on a somewhat smaller scale at the present time. You are all no doubt more or less familiar with the events that led up to this determined fight against the mosquito, but a brief review of the main facts will not be amiss at this point. Honolulu has had a good many mosquito eradication campaigns, but none have been so liberally supported, and comprehensively executed as the one referred to above, when it was found that a case of yellow fever had made its appearance in this city. The victim was an Hawaiian who had been employed as a quarantine guard on board the Japanese steamer Hongkong Maru. This vessel had arrived off this port a few days previously with a case of yellow fever on board. Ample funds were made immediately available, the section of the city where the case occurred was depopulated and fumigated, a committee under the name of Civic Sanitation Committee consisting of eight members was appointed by the commercial bodies of Honolulu, a field force made up in part of non-commissioned officers of the army was rapidly organized under the immediate supervision of Dr. Donald H. Currie of the U. S. Public Health Service. Dr. Rupert Blue, now surgeon-general of the public health service, assumed charge of the campaign when Dr. Currie was ordered to San Francisco, and Dr. Blue was in turn relieved by Dr. George W. McCoy, who directed the campaign for several months, when it was turned over to the board of health.

The greatest credit is due the chamber of commerce, merchants' association and other business interests of the city for their helpful and active cooperation in paying the way for this fight against the mosquito.

From November, 1911, to July, 1912, the sum of about \$100,000 was expended, the larger part of which was required for the first 50 days. Beginning with July, 1912, it has cost approximately \$2000 per month, which is sufficient for 18 inspectors and 10 laborers. Experience has shown that this force can cover the city in a satisfactory way. At the present time about \$2100 per month is being expended for mosquito eradication.

There are three species of mosquito in Honolulu.

(1) *Stegomyia calopus*, which is known to transmit the organism or virus that causes yellow fever.

(2) *Stegomyia scutellaris*, a first cousin of the *calopus* which may transmit yellow fever, however this has not been proven.

(3) *Culex fatigans*, the dengue fever mosquito, and the carrier of the dreaded filarial disease.

The diseases that are known to be transmitted by the mosquito are:

(1) Yellow fever.  
(2) Malaria.  
(3) Filariasis.  
(4) Dengue fever.

The campaign in Honolulu was directed against the *S. calopus* or yellow fever mosquito and its cousin *S. scutellaris* primarily, but the *Culex* was not overlooked, much to the delight of that part of the populace who have experienced the aches and pains of dengue fever. We have with us the mosquitoes that transmit yellow fever, filariasis and dengue, but fortunately are not yet cursed with the malarial fever carrier, the *Anopheles*. In my humble opinion the *Anopheles* mosquito if once introduced into these islands and allowed to propagate its kind without restraint, would occasion more misery and suffering and economic loss than all the epidemics of yellow fever that we may through carelessness have imposed upon us.

The following bit of interesting history is a good illustration of what is in store for the Hawaiian islands if the campaign against the mosquito is not made a permanent feature of our sanitary work. For centuries after its discovery and colonization Mauritius was noted for its beauty, its delightful climate, and for its salubrity. There were no *Anopheles* there in the days of Paul and Virginia. Situated in the middle of the Indian ocean far away from continental influences, it enjoyed an equable climate well suited to recruit the broken down anemic constitution of the victim of tropical diseases. So high was its reputation for salubrity that up to the early sixties, in times when Europe was not so accessible as it is at the present day, it was used as a sanatorium by the British in India. Of course many of the invalid soldiers and civilians who visited the island and many of the imported Indians who labored on the extensive sugar plantations for which Mauritius was famous, must have introduced times without number, malarial parasites. In those happy days, there being no *Anopheles* present, any imported parasites did not spread—the died out. But about the time I mention, that is to say in the early sixties, *Anopheles* were introduced, how is not known. Gradually they spread over the island, carrying the malarial germ with them. An epidemic that decimated the population was the consequence, malaria is now endemic, and beautiful Mauritius, formerly known for its salubrity, has become a by-word for unhealthiness.

We will now turn to just the opposite picture, where a malaria infested island was reclaimed and made habitable for man, through the application of the principles of sanitary science and a clear conception of the mosquito and its habits.

Brione, an island off the coast of Italy which belongs to Austria was known as the "Island of Death." Of the first twelve settlers in recent times 11 died of malaria and this condition existed for years. The island, however, was very fertile, and from the standpoint of its luxuriant foliage could well be styled the "Paradise of the Mediterranean." In the latter part of the 19th century it sold for \$10,000 and changed hands several times at prices going as high as \$40,000 when the last purchasers about ten or twelve years ago appealed to the Austrian government to free the island of malaria. The government placed the work under the direction of the famous Dr. Koch of Berlin, who sent Dr. Rivas, then one of his assistants, and now an instructor in tropical medicine at the University of Pennsylvania, with full powers of quarantine, treatment and preventive measures against mosquitoes and malarial patients. In two years the death rate from all causes was cut down about 50 per cent, and in two years more malaria was absolutely eliminated from the island. Today the island is the favorite resort of the crown prince of Austria, and the owner has just recently refused an offer of five million dollars for his property.

With the increasing opportunities of these modern days for rapid travel and communication, many islands and isolated districts at present healthy will at no distant date share the fate of Mauritius unless, before it is too late, effective measures are taken to prevent the introduction of the *Anopheles* mosquito. Let British experience in Mauritius be a warning to you who dwell in the Hawaiian islands. The results of the campaign in Honolulu have been very satisfactory. Day mosquitoes, the yellow fever carriers, have been reduced to a negligible number. In most parts of the city they have entirely disappeared, and the dengue or night mosquitoes have been materially reduced in number. The yellow fever mosquito is easily identified at sight by those who are familiar with its characteristic markings, and yet in nearly a year's time but one single mosquito of this species has come to my notice in the business portion of the city, where they fairly swarmed the year previous and made life miserable for everyone. At the present time I believe it would be perfectly safe to take a yellow fever patient from a ship and convey him to any part of this city for treatment without any danger of being bitten by the *S. calopus*. Gentlemen, your campaign against the yellow fever carrier has been a decided success, but you must not rest on your oars and congratulate yourselves with the thought of past achievement. This campaign, so well instituted and so thoroughly executed up to the present time, must be kept going. You must make it permanent.

According to statistics from the board of health, the mosquito campaign has almost put dengue fever in the class of "has-beens." The report I have here will convince anyone that the night mosquito has not enjoyed any particular immunity to the raids of the old brigade during the past year. From the time mosquitoes were introduced into Hawaii they have been with us and always will be in numbers more or less. Total extermination would be ideal, but is not possible nor practicable. Good work has been done against the mosquito in Honolulu and it behooves the businessmen of this "Paradise of the Pacific" to lend their aid in every possible way with the end in view of making the mosquito suppression campaign a permanent feature of the broad general fight that Hawaii is making against the introduction of the whole host of infectious and contagious diseases.

To this end every man interested in Hawaii's welfare should urge his representative in the legislature to appropriate liberally for the work that is absolutely necessary for the next two years. Such appropriations should be based on estimates submitted by the president of the board of health, who is thoroughly informed on this subject. At this point I want you to hold up the hands of that quiet, energetic man who now has charge of all matters affecting the health of this territory. I care not what his politics may be, he has made good as the president of the board of health and guardian of the health of the citizens of this country, and in my opinion it would be difficult indeed to find a man qualified to assume his duties.

The great practical value of the facts I have mentioned is patent to every thoughtful individual. With common sense, a moderate amount of money, and a clear conception of the mosquitoes and their habits, we should be able to practically abolish them and the dreaded diseases that they carry in any community. Wise men profit by the experience of others, and a solemn warning is hereby sounded lest the history of Mauritius be repeated in this "Paradise of the Pacific," which will be the antithesis of a paradise if the *Anopheles* gains entry and along with its companion scourges the *S. calopus* and *Culex fatigans* is allowed to propagate without molestation.

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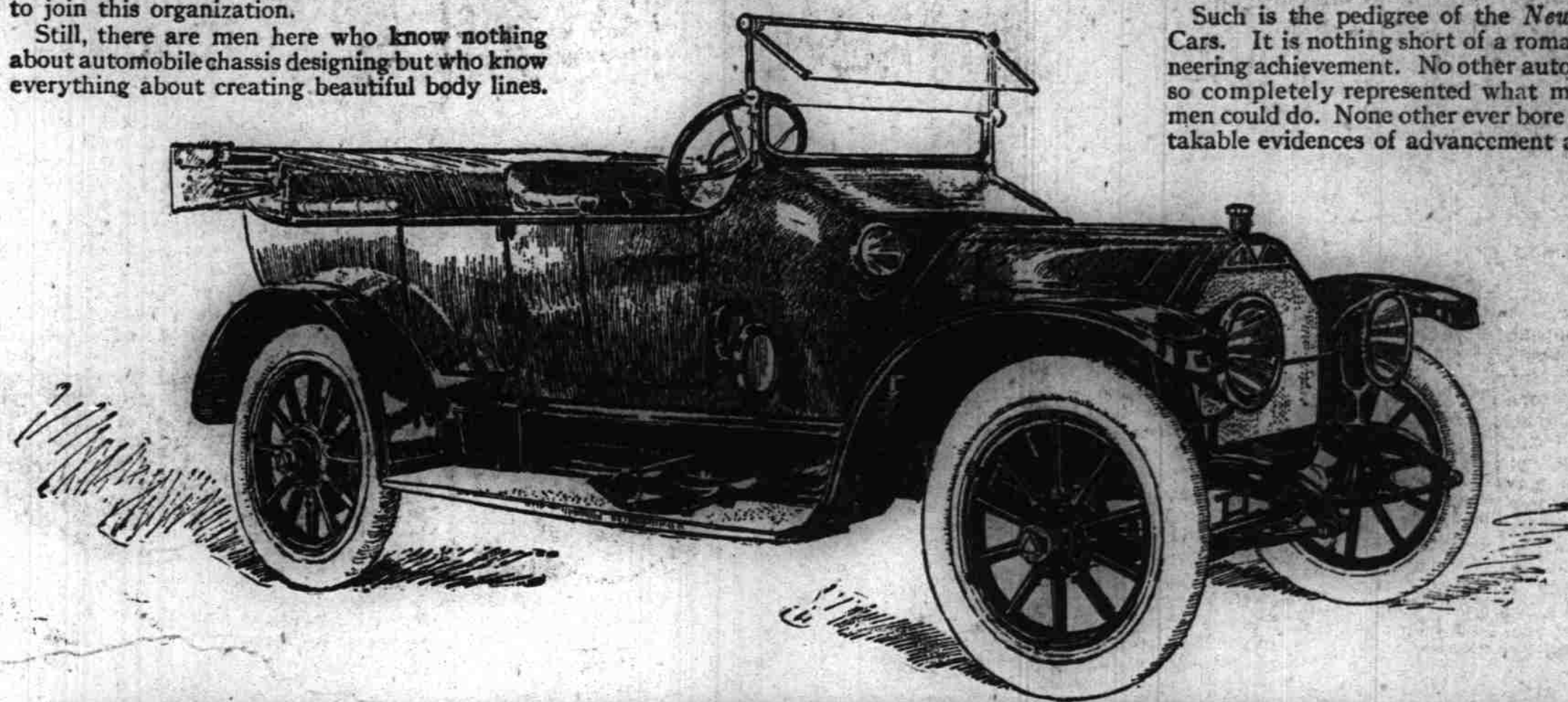
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